



6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 82

[EPA-HQ-OAR-2017-0472; FRL-9981-89-OAR]

RIN 2060-AT53

Protection of Stratospheric Ozone: Revision to References for Refrigeration and Air Conditioning Sector To Incorporate Latest Edition of Certain Industry, Consensus-based Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: On December 11, 2017, the U.S. Environmental Protection Agency (EPA) published a direct final rule and an accompanying notice of proposed rulemaking entitled “Protection of Stratospheric Ozone: Revision to References for Refrigeration and Air Conditioning Sector To Incorporate Latest Edition of Certain Industry, Consensus-based Standards.” EPA proposed to modify the use conditions required for use of three flammable refrigerants—*isobutane* (R-600a), *propane* (R-290), and *R-441A*—in new household refrigerators, freezers, and combination refrigerators and freezers under the Significant New Alternatives Policy (SNAP) program to reflect an updated standard from Underwriters Laboratories. Because EPA received adverse comment, EPA withdrew the direct final rule through a separate notice. In this action, EPA is addressing relevant comments and finalizing the proposed use conditions with no changes.

DATES: This rule is effective on **[INSERT DATE 30 DAYS FROM DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of **[INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2017-0472. All documents in the docket are listed on the <https://www.regulations.gov> web site. Although listed in the index, some information is not publicly available, e.g., confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through <https://www.regulations.gov> or in hard copy at the Air and Radiation Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Avenue, NW. Washington, D.C. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air and Radiation Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Chenise Farquharson, Stratospheric Protection Division, Office of Atmospheric Programs (Mail Code 6205T), Environmental Protection Agency, 1200 Pennsylvania Ave. NW., Washington, DC 20460; telephone number: 202-564-7768; email address: farquharson.chenise@epa.gov. Notices and rulemakings under EPA’s SNAP program are available on EPA’s Stratospheric Ozone website at <https://www.epa.gov/snap/snap-regulations>.

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I. General Information

A. *What action is EPA taking?*

On December 11, 2017, EPA published a direct final rule (82 FR 58122) to modify the use conditions for three flammable hydrocarbon refrigerants—*isobutane (R-600a)*, *propane (R-290)*, and *R-441A*—used in new household refrigerators, freezers, and combination refrigerators and

freezers (hereafter “household refrigerators and freezers”) by replacing four of the five use conditions in previous hydrocarbon refrigerants rules under EPA’s Significant New Alternatives Policy (SNAP) program (76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015) with the revised Underwriters Laboratories (UL) Standard 60335-2-24, “Household and Similar Electrical Appliances - Safety - Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers” (2nd edition, April 28, 2017). We stated in that direct final rule that if we received adverse comment by January 25, 2018, we would publish a timely withdrawal in the Federal Register so that the direct final rule would not take effect. EPA received adverse comment on the direct final rule and published a separate notice withdrawing the direct final rule on March 7, 2018 (83 FR 9703).

EPA also published a Notice of Proposed Rulemaking on December 11, 2017 accompanying the direct final rule, entitled “Protection of Stratospheric Ozone: Revision to References for Refrigeration and Air Conditioning Sector To Incorporate Latest Edition of Certain Industry, Consensus-based Standards” (82 FR 58154). That notice proposed to make the same changes to the relevant listing decisions as in the direct final rule. This action addresses the comments received and finalizes the revisions to the relevant listing decisions, as proposed.

B. Does this action apply to me?

This action regulates the use of three flammable hydrocarbon refrigerants—isobutane, propane, and the hydrocarbon blend R-441A—in new household refrigerators and freezers. Table 1 identifies entities potentially affected by this action. Regulated entities may include:

Table 1. Potentially Regulated Entities by North American Industrial Classification System (NAICS) Code

Category	NAICS code	Description of regulated entities
Industry	333415	Manufacturers of Refrigerators, Freezers, and Other Refrigerating or Freezing Equipment, Electric or Other (NESOI); Heat Pumps Not Elsewhere Specified or Included;

		and Parts Thereof
Industry	335222	Household Refrigerator and Home Freezer Manufacturing
Industry	811412	Appliance Repair and Maintenance

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is currently aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your entity is regulated by this action, you should carefully examine the applicability criteria found in 40 CFR Part 82. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the FOR FURTHER INFORMATION CONTACT section.

II. Background

A. What is the affected end-use?

Household refrigerators and freezers are intended primarily for residential use, although they may be used outside the home (e.g., workplace kitchen pantries). The designs and refrigeration capacities of equipment vary widely. This equipment is composed of three main categories: household freezers only offer storage space at freezing temperatures, household refrigerators only offer storage space at non-freezing temperatures, and products with both a refrigerator and freezer in a single unit are referred to as combination refrigerators and freezers. The combination products are the most common. Certain small refrigerated household appliances (e.g., chilled kitchen drawers, wine coolers, and mini-fridges) are also within this end-use. Household refrigerators and freezers have all refrigeration components integrated, and for the smallest types, the refrigeration circuit is entirely brazed or welded. These systems are charged with refrigerant at the factory and typically require only an electricity supply to begin operation.

The 2014 American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Handbook of Refrigeration provides an overview of food preservation in regard to household refrigerators and freezers. Generally, a storage temperature between 32 and 39°F (0 to 3.9°C) is desirable for preserving fresh food. Humidity and higher or lower temperatures are more suitable for certain foods and beverages. Wine chillers, for example, are frequently used for storing wine, and have slightly higher optimal temperatures from 45 to 65°F (7.2 to 18.3°C). In single-door refrigerators, the optimum conditions for food preservation are also slightly higher since food storage is not intended for long-term storage. Freezers and combination refrigerators and freezers that are designed to store food for long durations are generally designed to hold temperatures near 0 to 5°F (-17.7 to -15°C).

Refrigerant flammability

American National Standards Institute (ANSI)/ASHRAE Standard 34–2016 assigns a safety group classification for each refrigerant which consists of two alphanumeric characters (e.g., A2 or B1). The capital letter indicates the toxicity and the numeral denotes the flammability. ASHRAE classifies Class A refrigerants as refrigerants for which toxicity has not been identified at concentrations less than or equal to 400 parts per million (ppm) by volume, based on data used to determine threshold limit values (TLV)–time weighted average (TWA) or consistent indices. Class B signifies refrigerants for which there is evidence of toxicity at concentrations below 400 ppm by volume, based on data used to determine TLV–TWA or consistent indices.

The refrigerants are also assigned a flammability classification of 1, 2, or 3. Tests are conducted in accordance with American Society for Testing and Materials (ASTM) E681 using a spark ignition source at 60 °C and 101.3 kPa.¹ The flammability classification “1” is given to refrigerants that, when tested, show no flame propagation. The flammability classification “2” is

¹ ASHRAE, 2016. ANSI/ASHRAE Standard 34–2016: Designation and Safety Classification of Refrigerants.

given to refrigerants that, when tested, exhibit flame propagation, have a heat of combustion less than 19,000 kJ/kg (8,174 British thermal units (BTU)/lb), and have a lower flammability limit (LFL) greater than 0.10 kg/m³. Refrigerants within flammability classification “2” may optionally be designated in the subclass “2L” if they have a maximum burning velocity of 10 cm/s or lower when tested at 23.0 °C and 101.3 kPa. The flammability classification “3” is given to refrigerants that, when tested, exhibit flame propagation and that either have a heat of combustion of 19,000 kJ/kg (8,174 BTU/lb) or greater or an LFL of 0.10 kg/m³ or lower. Thus, refrigerants with flammability classification “3” are highly flammable while those with flammability classification “2” are less flammable and those with flammability classification “2L” are mildly flammable.

For both toxicity and flammability classifications, refrigerant blends are designated based on the worst-case estimate of fractionation determined for the blend. Figure 1 illustrates these safety group classifications.

Figure 1. Refrigerant Safety Group Classification

Safety Group

↑ Increasing Flammability ↑	Higher Flammability	A3	B3
	Lower Flammability	A2	B2
		A2L	B2L
	No Flame Propagation	A1	B1
		Lower Toxicity	Higher Toxicity
		→ Increasing Toxicity →	

B. Use conditions

EPA previously found isobutane, propane, and R-441A acceptable, subject to use conditions, in new household refrigerators and freezers (76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015). In the proposed and final rules, EPA provided information on the

environmental and health properties of the three refrigerants and the various other substitutes available for use in household refrigerators and freezers. EPA's risk screens for the three refrigerants are available in the docket for these rulemakings (EPA-HQ-OAR-2009-0286 and EPA-HQ-OAR-2013-0748).^{2,3}

Isobutane, propane, and R-441A have an ASHRAE classification of A3, indicating that they have low toxicity and high flammability. The flammability risks are of concern because household refrigerators and freezers have traditionally used refrigerants that are not flammable. In the presence of an ignition source (e.g., static electricity, a spark resulting from a closing door, or a cigarette), an explosion or a fire could occur if the concentration of isobutane, propane, and R-441A were to exceed the LFL of 18,000 ppm, 21,000 ppm, and 20,500 ppm, respectively.

To address the flammability risk, which is not posed by other available refrigerants in this end-use, EPA listed the refrigerants as acceptable, subject to use conditions, in new household refrigerators and freezers. The use conditions ensure minimization of flammability risk by incorporating by reference Supplement SA to the 10th edition of UL Standard 250, and by including refrigerant charge size limits and requirements for markings on equipment using the refrigerants to inform consumers and technicians of potential flammability hazards. Without appropriate use conditions, the flammability risk posed by the refrigerants could be higher than non-flammable refrigerants because individuals may not be aware that their actions could potentially cause a fire, and because the refrigerants could be used in existing equipment that has not been designed specifically to minimize flammability risks. Our assessment and listing decisions (76 FR 78832; December 20, 2011 and 80 FR 19454; April 10, 2015) found that with the use conditions, the overall risk of these substitutes, including the risk due to flammability, does not

² Isobutane and R-441A: 75 FR 25799, May 10, 2010 (proposed rule); 76 FR 78832, December 20, 2011 (final rule).

³ Propane: 79 FR 38811, July 9, 2014 (proposed rule); 80 FR 19454, April 10, 2015 (final rule).

present significantly greater risk in the end-use than other substitutes that are currently or potentially available for that same end-use.

The use conditions required the following:

1. *New equipment only; not intended for use as a retrofit alternative*: “These refrigerants may be used only in new equipment designed specifically and clearly identified for the refrigerant (i.e., none of these substitutes may be used as a conversion or ‘retrofit’⁴ refrigerant for existing equipment designed for a different refrigerant);”

2. *UL standard*: “These refrigerants may be used only in a refrigerator or freezer, or combination refrigerator and freezer, that meets all requirements listed in Supplement SA to the 10th edition of the UL Standard for Household Refrigerators and Freezers, UL 250, dated August 25, 2000). In cases where the final rule includes requirements more stringent than those of the 10th edition of UL Standard 250, the appliance must meet the requirements of the final rule in place of the requirements in the UL standard;”

3. *Charge size*: “The charge size must not exceed 57 grams (2.01 ounces) in any refrigerator, freezer, or combination refrigerator and freezer in each circuit;”

4. *Labeling*: “As provided in clauses SA6.1.1 and SA6.1.2 of UL Standard 250, 10th edition, the following markings must be attached at the locations provided and must be permanent:

a. On or near any evaporators that can be contacted by the consumer: ‘DANGER—Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing.’

b. Near the machine compartment: ‘DANGER—Risk of Fire or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.’

⁴ Sometimes conversion refrigerant substitutes are inaccurately referred to as “drop in” replacements.

c. Near the machine compartment: ‘CAUTION—Risk of Fire or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner’s Guide Before Attempting To Service This Product. All Safety Precautions Must be Followed.’

d. On the exterior of the refrigerator: ‘CAUTION—Risk of Fire or Explosion. Dispose of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used.’

e. Near any and all exposed refrigerant tubing: ‘CAUTION—Risk of Fire or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used.’

All of these markings must be in letters no less than 6.4 mm (1/4 inch) high.”

5. *Color-coded hoses and piping*: “The refrigerator, freezer, or combination refrigerator and freezer must have red Pantone Matching System (PMS) #185 marked pipes, hoses, or other devices through which the refrigerant is serviced (typically known as the service port), to indicate the use of a flammable refrigerant. This color must be present at all service ports and where service puncturing or otherwise creating an opening from the refrigerant circuit to the atmosphere might be expected (e.g., process tubes). The color mark must extend at least 2.5 centimeters (1 inch) from the compressor and must be replaced if removed.”

C. UL Standard 60335-2-24

In 2011, UL formed a Joint Task Group (JTG) comprised of members of its Standards Technical Panel (STP) to develop recommendations for addressing the use and safety of refrigerants classified as A2, A2L, and A3 in refrigeration and air conditioning (AC) equipment. One of the outcomes is the 2017 UL Standard 60335-2-24, which is based on International Electrotechnical Commission (IEC) Standard 60335-2-24 “Household and Similar Electrical

Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers” (edition 7.1, May 2012). The 2017 UL Standard 60335-2-24 was developed in an open and consensus-based approach, with the assistance of experts in the refrigeration and AC industry as well as experts involved in assessing the safety of products. The revision cycle, including final recirculation, concluded on February 6, 2017, and UL published the standard on April 28, 2017. The 2017 UL Standard replaces the previously published version of this same standard as well as UL Standard 250 Supplement SA, “Requirements for Refrigerators and Freezers Employing a Flammable Refrigerant in the Refrigerating System” (Edition 10, August 25, 2000).

The 2017 UL Standard 60335-2-24 limits the charge size for each separate refrigerant circuit (i.e., compressor, condenser, evaporator, and refrigerant piping) to 150 grams (5.3 ounces). Additionally, the 2017 standard requires testing of refrigeration appliances containing flammable refrigerants, including leakage tests, temperature and scratch tests, and heat testing requirements to address the hazards due to ignition of leaked refrigerant by potential ignition sources associated with the appliance (see sections 22.107-22.110 and the relevant annexes of the standard for specific testing requirements). These tests are intended, among other things, to ensure that any leaks will result in concentrations well below the LFL, and that potential ignition sources will not be able to create temperatures high enough to start a fire. Appliances that are in compliance with the 2017 UL Standard 60335-2-24 have passed appropriate ignition or leakage tests as stipulated in the standard. Passing the leakage test ensures that refrigerant concentrations in the event of a leak do not reach or exceed 75 percent of the LFL inside any internal or external electrical component compartments.

III. What Is EPA Finalizing in This Action?

As proposed, EPA is revising the use conditions for propane, isobutane and R-441 in the household refrigerators and freezers end-use. We are finalizing the use conditions for each substitute as follows:

A. Use conditions

EPA is replacing the reference to Supplement SA to the 10th edition of UL Standard 250 in use condition “2” with “UL Standard 60335-2-24, Safety Requirements for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers (2nd Edition, April 28, 2017).” In addition, EPA is removing use conditions “3,” “4,” and “5” because the conditions specified in those use conditions are specified in 2017 UL standard 60335-2-24; the incorporation of 2017 UL standard 60335-2-24 in condition 2 includes the requirements in previous conditions 3, 4, and 5. The use conditions provide the same level of assurance that the three substitutes can be used as safely as other available alternatives. The revised use conditions apply to new household refrigerators and freezers manufactured after the effective date of this regulation. The new use conditions are as follows:

1. *New equipment only; not intended for use as a retrofit alternative:* Propane, isobutane, and R-441A may be used only in new equipment designed specifically and clearly identified for the refrigerant (i.e., none of these substitutes may be used as a conversion or “retrofit”⁵ refrigerant for existing equipment designed for a different refrigerant); and
2. *UL standard:* These refrigerants may be used only in equipment that meets all requirements in the 2017 UL Standard 60335-2-24.

B. Rationale for changed use conditions

1. Charge size

EPA previously required a charge size limit of 57 grams (2.01 ounces) for each separate

⁵ Sometimes conversion refrigerant substitutes are inaccurately referred to as “drop in” replacements.

refrigerant circuit in a refrigerator or freezer. The 2017 UL Standard 60335-2-24 specifies that the maximum charge size for each separate refrigerant circuit in a refrigerator or freezer must be no greater than 150 grams (5.29 ounces).

As discussed in the December 2017 direct final rule, EPA evaluated reasonable worst-case and more typical, yet conservative, scenarios to model the effects of the sudden release of each refrigerant from a household refrigerator or freezer containing the maximum charge size of 150 grams (5.29 ounces). This was done to determine whether the refrigerants would present flammability or toxicity concerns for consumers or workers, including those servicing or disposing of appliances. To represent a reasonable worst-case scenario, it was assumed that a catastrophic leak of each refrigerant would occur while the refrigerator or freezer unit is in a residential kitchen with a height of approximately 2.4 meters (i.e., a standard 8-foot ceiling) and a minimum effective volume of 18 m³ (640 ft³) or an effective volume of 53 m³ (1,870 ft³) (i.e., excluding the space filled by cabinets, other kitchen equipment) (Murray 1997; NKBA 2016). The minimum kitchen volume of 18 m³ (640 ft³) does not consider residential kitchen spaces that are often connected to breakfast nooks or other rooms (e.g., living room, dining room) through open pathways or swinging doors, which would also increase the effective volume of the space into which a refrigerant would be released, thereby reducing the likelihood that the instantaneous concentration of the refrigerants would exceed the LFL. Conversely, the larger kitchen volume used in the analysis (i.e., 53 m³) considers air-mixing that is likely to occur within the spaces that are adjacent to the kitchen (Murray 1997; NKBA 2016). The minimum effective kitchen volume modeled in this analysis is conservative, as it is approximately half the size of the average kitchen in a new single-family home in the United States (i.e., 36 m³) (NKBA 2016). The larger kitchen volume of 53 m³ includes adjacent areas to the kitchen, such as a breakfast nook, and is more conservative

than the average estimated volume of a kitchen with a breakfast nook in a U.S. household (i.e., 65 m³) (NKBA 2016).

EPA's analysis for each of the refrigerants revealed that even if the unit's full charge were emitted within one minute, the concentration would not reach the LFL for that refrigerant in the less conservative 53 m³ (1,870 ft³) kitchen, showing a lack of flammability risk. The threshold analyses demonstrated that a flammability concern could exist in the minimum modeled kitchen volume (i.e., 18 m³ (640 ft³)) if the charge size of the household refrigerator or freezer exceeded 120 grams, which is slightly smaller than the maximum modeled charge size (i.e., 150 grams). However, the estimated exposures were derived using conservative assumptions (e.g., small room size, no ventilation). A 150-gram household refrigeration unit would have to be installed in a kitchen at least 2.3 times smaller than the less conservative kitchen size modeled, in the worst-case conditions at end-use, for flammability to be of concern. As a result, EPA determined that a release of a 150-gram unit does not present a significant flammability risk in the reasonable worst-case scenario for the three refrigerants in household refrigerators and freezers.

Concerning toxicity of the refrigerants, our risk screens found that the 30-minute acute exposure guideline level (AEGL) (i.e., 6,900 ppm) is exceeded only in the worst-case scenario for the minimum kitchen volume (i.e., 18 m³). Based upon our analysis, the minimum room sizes in which installed equipment could cause a toxicity concern would have to be approximately 0.8 times smaller than the larger modeled room size of 53 m³ (1,870 ft³), which is a conservative kitchen volume in the United States (Murray 1997; NKBA 2016). Thus, we have determined that isobutane, propane, and R-441A do not pose significantly greater flammability and toxicity risks than other acceptable refrigerants in the household refrigerators and freezers end-use. The higher charge size included in the revised use condition will provide greater flexibility to appliance

manufacturers in the design of equipment while also ensuring that such equipment will not pose greater risk than similar equipment using other acceptable alternatives. For more information about EPA's risk assessments, see the docket for this rulemaking (EPA-HQ-OAR-2017-0472).

EPA is not retaining a separate charge size limit as a use condition because it would be redundant of the updated UL standard. Therefore, we are replacing the use condition in "3" with the 2017 UL Standard 60335-2-24.

2. Color-coded hoses and piping, and labeling

The 2017 UL Standard 60335-2-24 includes requirements for red PMS #185 marked pipes, hoses, and other devices through which the refrigerant passes, and requirements for markings in letters no less than 6.4 mm (1/4 inch) high to inform consumers and technicians of potential flammability hazards are addressed in (see sections 7.1 and 22.106 of the standard for additional information on the required marking and warning labels). Retaining the use conditions in "4" and "5" in EPA's previous hydrocarbon refrigerants rules would be redundant of the updated standard. Therefore, we are replacing the use conditions in "4" and "5" with the 2017 UL Standard 60335-2-24.

C. *Incorporation by reference*

Through this action EPA is incorporating by reference the 2017 UL Standard 60335-2-24, which establishes requirements for the evaluation of household and similar electrical appliances, and safe use of flammable refrigerants. The standard is discussed in greater detail elsewhere in this preamble. This approach is the same as that used to incorporate Supplement SA to the 10th edition of UL Standard 250 in our previous rules on flammable refrigerants (76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015).

The 2017 UL Standard 60335-2-24 is available for purchase by mail at: COMM 2000, 151

Eastern Avenue, Bensenville, IL 60106; Email: orders@shopulstandards.com; Telephone: 1-888-853-3503 in the U.S. or Canada (other countries dial 1-415-352-2178); Internet address: http://www.shopulstandards.com/ProductDetail.aspx?productId=UL60335-2-24_2_B_20170428 (*ULStandards2*). The cost of the 2017 UL Standard 60335-2-24 is \$454 for an electronic copy and \$567 for hardcopy. UL also offers a subscription service to the Standards Certification Customer Library (SCCL) that allows unlimited access to their standards and related documents. The cost of obtaining this standard is not a significant financial burden for equipment manufacturers and purchase is not required for those selling, installing, and servicing the equipment. Therefore, EPA concludes that the UL standard being incorporated by reference is reasonably available.

D. Equipment manufactured prior to effective date of this rule

The use conditions in this action apply to new household refrigerators and freezers manufactured after the effective date of this regulation. This final rule does not apply to or affect equipment manufactured before the effective date of this action and manufactured in compliance with the SNAP requirements applicable at the time of manufacture.

IV. Response to Comments

EPA received 17 comments on the December 11, 2017, notice of proposed rulemaking. Below EPA is responding to six of those comments, which were either relevant to this rulemaking or raised issues that were addressed in related rulemakings. The other eleven comments raised issues that are outside the scope of this rulemaking or are not relevant to any related rulemaking, so EPA is not providing a specific response to those comments.

A. Compliance with the 2017 UL Standard 60335-2-24

Comment: Three commenters expressed support for the proposed changes to the use conditions to reflect the 2017 UL Standard 60335-2-24. The commenters noted that the revised use

conditions would not place any significant burden on the regulated community, would ensure consistency with consensus-based standards, and would encourage manufacturers of home refrigeration appliances and suppliers of refrigerants to transition to more environmentally friendly refrigerants.

Response: EPA acknowledges the support and is finalizing the revised use conditions for use of isobutane, propane, and R-441A in household refrigerators and freezers as proposed.

B. *Flammability*

Comment: Three commenters raised concerns about flammability risks and firefighter safety in homes and other buildings due to the 150-gram maximum allowable charge size. The commenters asserted that there would be negative impacts and implications related to the higher charge size, particularly for propane, and encouraged EPA to consult with firefighter organizations, such as the National Volunteer Fire Council or the Fire Department Safety Officers of America.

Response: EPA recognizes that flammability is an important consideration with regard to the 150-gram charge size. As discussed above in section III.2.a, EPA evaluated flammability and toxicity risks for isobutane, propane, and R-441A at the maximum charge size as provided in the risk screens included in the docket for this rulemaking (Docket ID EPA-HQ-OAR-2017-0472-0006, -0007, and -0008). EPA evaluated toxicity risk by considering exposure to workers (including those servicing or disposing of appliances), consumers, and the general public. EPA evaluated flammability risk by evaluating reasonable worst-case and more typical, yet conservative, scenarios to model the effects of the sudden release of each refrigerant from a household refrigerator or freezer containing the maximum charge. Our risk screens found that equipment that met the 150-gram charge limit did not exceed the LFL for each of the three refrigerants in household refrigerators and freezers in a conservatively sized 53 m³ (1,870 ft³)

kitchen (see section III.B.1 above for the minimum and average kitchen zone volumes). The commenters did not provide any technical support for their statements or information demonstrating that use of any of the three refrigerants in household refrigerators and freezers at a charge of 150 grams (5.3 ounces) would pose significantly greater risk than other available alternatives in this end-use. We note that the use conditions required by this final rule include specific safety testing requirements in the 2017 UL Standard 60335-2-24, which are intended, among other things, to ensure that any leaks will result in concentrations well below the LFL, and that potential ignition sources will not be able to create temperatures high enough to start a fire. The use conditions also provide additional safety measures and labeling requirements (e.g., visible warning statement and red coloring on the pipes, hoses, and devices which contain refrigerant) that make equipment owners, consumers, fire marshals, and emergency first responders aware of the presence of a flammability risk. Moreover, EPA is aware of the longstanding widespread use on a global basis of household refrigerators and freezers using this charge limit. EPA agrees that greater awareness of the presence, risks, and benefits of flammable refrigerants among fire marshals and first responders would be beneficial.

C. Recovery and Recycling Equipment

Comment: One commenter voiced concerns that isobutane, propane, and R-441A were exempted from the venting prohibition because machines for the recovery of flammable refrigerants are not currently available in the United States. The commenter stated that hydrocarbon refrigerants are odorless, require a procedure for proper handling and storing, and “undermine our whole premise of not knowingly venting an ODS refrigerant or its alternate.” In contrast, two commenters provided supporting information regarding the safe servicing of household appliances with flammable refrigerants and the availability of equipment and

technologies to safely recover and reclaim flammable refrigerants.

Response: These comments are outside the scope of this rulemaking. EPA did not propose and is not today finalizing any changes to its previous determinations that venting, releasing, or disposing of these refrigerants used in this end-use does not pose a threat to the environment under CAA section 608(c)(2). EPA made these determinations under section 608(c)(2) in final rules issued in 2014 and 2015 (79 FR 29682, May 23, 2014; 80 FR 19454, April 10, 2015) and did not reopen those determinations in this rulemaking. EPA directs the commenters to those rules for additional information. EPA appreciates the information provided by commenters with regard to the availability of recovery and recycling equipment.

V. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at <https://www.epa.gov/laws-regulations/laws-and-executive-orders>.

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is not a significant regulatory action and was therefore not submitted to the Office of Management and Budget (OMB) for review.

B. Executive Order 13771: Reducing Regulation and Controlling Regulatory Costs

This action is not an Executive Order 13771 regulatory action because this action is not significant under Executive Order 12866.

C. Paperwork Reduction Act (PRA)

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection requirements contained in the existing regulations and has assigned OMB control number 2060–0226. This rule contains no new

requirements for reporting or recordkeeping.

D. *Regulatory Flexibility Act*

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. In making this determination, the impact of concern is any significant adverse economic impact on small entities. An agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, has no net burden or otherwise has a positive economic effect on the small entities subject to the rule.

The use conditions of this rule apply to manufacturers of new household refrigerators and freezers that choose to use flammable refrigerants. Today's action allows equipment manufacturers to use flammable refrigerants at a higher charge size than previously allowed in new household refrigerators and freezers but does not mandate such use; the change to the use conditions allows more flexibility for manufacturers in the design of equipment and thus reduces the regulatory burden to the regulated community. In some cases, it may reduce costs by allowing manufacturers to design equipment with a single, larger refrigerant circuit instead of multiple, smaller refrigerant circuits for the same piece of equipment.

E. *Unfunded Mandates Reform Act (UMRA)*

This action does not contain any unfunded mandate as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local or tribal governments or the private sector.

F. *Executive Order 13132: Federalism*

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

G. *Executive Order 13175: Consultation and Coordination with Indian Tribal Governments*

This action does not have tribal implications as specified in Executive Order 13175. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to this action.

H. *Executive Order 13045: Protection of Children from Environmental Health and Safety Risks*

This action is not subject to Executive Order 13045 because it is not economically significant as defined in Executive Order 12866, and because EPA does not believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. This action's health and risk assessments are contained in risk screens for the various substitutes.^{6,7,8} The risk screens are available in the docket for this rulemaking.

I. *Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*

This action is not a "significant energy action" because it is not likely to have a significant adverse effect on the supply, distribution or use of energy.

⁶ ICF, 2018a. Risk Screen on Substitutes in Household Refrigerators and Freezers; Substitute: Propane (R-290).

⁷ ICF, 2018b. Risk Screen on Substitutes in Household Refrigerators and Freezers; Substitute: Isobutane (R-600a).

⁸ ICF, 2018c. Risk Screen on Substitutes in Household Refrigerators and Freezers; Substitute: R-441A.

J. *National Technology Transfer and Advancement Act (NTTAA) and 1 CFR part 51*

This action involves a technical standard. EPA is revising the use conditions for the household refrigerators and freezers end-use by incorporating by reference UL Standard 60335-2-24, “Safety Requirements for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers” (2nd edition, April 2017), which establishes requirements for the evaluation of household and similar electrical appliances, and safe use of flammable refrigerants. The 2017 UL Standard 60335-2-24 supersedes the current edition of Supplement SA to the 10th edition of UL Standard 250, “Requirements for Refrigerators and Freezers Employing a Flammable Refrigerant in the Refrigerating System” (August 2000). EPA’s revision to the use conditions will replace Supplement SA to the 10th edition of UL Standard 250 with the 2017 UL standard 60335-2-24. This standard is available at https://standardscatalog.ul.com/standards/en/standard_60335-2-24_2, and may be purchased by mail at: COMM 2000, 151 Eastern Avenue, Bensenville, IL 60106; Email: orders@shopulstandards.com; Telephone: 1-888-853-3503 in the U.S. or Canada (other countries dial 1-415-352-2178); Internet address: http://www.shopulstandards.com/ProductDetail.aspx?productId=UL60335-2-24_2_B_20170428 (ULStandards2). The cost of UL 60335-2-24 is \$454 for an electronic copy and \$567 for hardcopy. UL also offers a subscription service to the Standards Certification Customer Library (SCCL) that allows unlimited access to their standards and related documents. The cost of obtaining this standard is not a significant financial burden for equipment manufacturers and purchase is not required for those selling, installing and servicing the equipment. Therefore, EPA concludes that the UL standard being incorporated by reference is reasonably available.

K. *Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*

The human health or environmental risk addressed by this action will not have potential disproportionately high and adverse human health or environmental effects on minority, low-income or indigenous populations. This action's health and environmental risk assessments are contained in the risk screens for the various substitutes. The risk screens are available in the docket for this rulemaking.

L. *Congressional Review Act (CRA)*

This action is subject to the CRA, and EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action is not a "major rule" as defined by 5 U.S.C. 804(2).

VI. References

Unless specified otherwise, all documents are available electronically through the Federal Docket Management System, Docket # EPA-HQ-OAR-2017-0472.

ASHRAE, 2016. ANSI/ASHRAE Standard 34–2016: Designation and Safety Classification of Refrigerants.

ICF, 2018a. Risk Screen on Substitutes in Household Refrigerators and Freezers; Substitute: Propane (R-290).

ICF, 2018b. Risk Screen on Substitutes in Household Refrigerators and Freezers; Substitute: Isobutane (R-600a).

ICF, 2018c. Risk Screen on Substitutes in Household Refrigerators and Freezers; Substitute: R-441A.

Murray, D.M., 1997. Residential house and zone volumes in the United States: empirical and estimated parametric distributions. *Risk Anal* 17: 439-446. Available online at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.1997.tb00884.x/full>.

National Kitchen and Bath Association (NKBA), 2016. Size of Kitchens in New U.S. Single Family Homes. August 2016. Available online at:

<https://nkba.myshopify.com/collections/research/products/size-of-kitchens-in-new-u-s-single-family-homes>.

UL 250. Household Refrigerators and Freezers. 10th edition. Supplement SA: Requirements for Refrigerators and Freezers Employing a Flammable Refrigerant in the Refrigerating System. August 2000.

UL 60335-2-24. Safety Requirements for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers. 2nd edition. April 2017.

List of Subjects in 40 CFR Part 82

Environmental protection, Administrative practice and procedure, Air pollution control, Incorporation by reference, Recycling, Reporting and recordkeeping requirements, Stratospheric ozone layer.

Dated: July 30, 2018.

Andrew R. Wheeler,
Acting Administrator.

For the reasons set out in the preamble, 40 CFR part 82 is amended as follows:

PART 82 - PROTECTION OF STRATOSPHERIC OZONE

1. The authority citation for part 82 continues to read as follows:

Authority: 42 U.S.C. 7414, 7601, 7671 - 7671q.

Subpart G - Significant New Alternatives Policy Program

2. Amend Appendix R to subpart G of part 82 by:

- a. Revising the appendix heading.
- b. Removing the two entries for “Household refrigerators, freezers, and combination refrigerators and freezers (New equipment only)” and adding a new entry in their place; and
- c. Revising the NOTE to Appendix R.

The revisions and additions to read as follows:

Appendix R to Subpart G of Part 82—Substitutes Subject to Use Restrictions Listed in the December 20, 2011, Final Rule, Effective February 21, 2012, in the April 10, 2015 Final Rule, Effective May 11, 2015, and in the [INSERT DATE OF PUBLICATION] Final Rule, Effective [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION]

Substitutes That Are Acceptable Subject to Use Conditions

End-use	Substitute	Decision	Use conditions	Further information
Household refrigerators, freezers, and combination refrigerators and freezers (New equipment only)	Isobutane (R-600a) Propane (R-290) R-441A	Acceptable subject to use conditions	As of [Insert date 30 days after date of publication in the Federal Register] : These refrigerants may be used only in new equipment designed specifically and clearly identified for the refrigerant (i.e., none of these substitutes may be used as a conversion or “retrofit” refrigerant for existing equipment designed for a different	Applicable OSHA requirements at 29 CFR part 1910 must be followed, including those at 29 CFR 1910.106 (flammable and combustible liquids), 1910.110 (storage and handling of liquefied petroleum gases), 1910.157 (portable fire extinguishers), and 1910.1000 (toxic and hazardous substances). Proper ventilation should be maintained at all times

			<p>refrigerant).</p> <p>These refrigerants may be used only in a refrigerator or freezer, or combination refrigerator and freezer, that meets all requirements listed in the 2nd edition of the Underwriters Laboratories (UL) Standard for Safety: Household and Similar Electrical Appliances – Safety - Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers, UL 60335-2-24, dated April 28, 2017.</p>	<p>during the manufacture and storage of equipment containing hydrocarbon refrigerants through adherence to good manufacturing practices as per 29 CFR 1910.106. If refrigerant levels in the air surrounding the equipment rise above one-fourth of the lower flammability limit, the space should be evacuated and re-entry should occur only after the space has been properly ventilated.</p> <p>Technicians and equipment manufacturers should wear appropriate personal protective equipment, including chemical goggles and protective gloves, when handling these refrigerants. Special care should be taken to avoid contact with the skin since these refrigerants, like many refrigerants, can cause freeze burns on the skin. A Class B dry powder type fire extinguisher should be kept nearby.</p> <p>Technicians should only use spark-proof tools when working on refrigerators and freezers with these refrigerants.</p> <p>Any recovery equipment used should be designed for flammable refrigerants. Any refrigerant releases should be in a well-ventilated area, such as outside of a building.</p> <p>Only technicians specifically trained in handling flammable refrigerants should service refrigerators and freezers containing these refrigerants. Technicians should gain an understanding of minimizing the risk of fire and the steps to use</p>
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				flammable refrigerants safely.
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NOTE: The use conditions in this appendix contain references to certain standards from Underwriters Laboratories Inc. (UL). The standards are incorporated by reference, and the referenced sections are made part of the regulations in part 82:

1. UL 471. Commercial Refrigerators and Freezers. 10th edition. Supplement SB: Requirements for Refrigerators and Freezers Employing a Flammable Refrigerant in the Refrigerating System. Underwriters Laboratories, Inc. November 24, 2010.
2. UL 484. Room Air Conditioners. 8th edition. Supplement SA: Requirements for Room Air Conditioners Employing a Flammable Refrigerant in the Refrigerating System and Appendices B through F. December 21, 2007, with changes through August 3, 2012.
3. UL 541. Refrigerated Vending Machines. 7th edition. Supplement SA: Requirements for Refrigerated Venders Employing a Flammable Refrigerant in the Refrigerating System. December 30, 2011
4. UL Standard 60335-2-24. Standard for Safety: Requirements for Household and Similar Electrical Appliances, - Safety - Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers, Second edition, dated April 28, 2017.

The Director of the Federal Register approves the incorporation by reference of the material under "Use Conditions" in the table "SUBSTITUTES THAT ARE ACCEPTABLE SUBJECT TO USE CONDITIONS" (5 U.S.C. 552(a) and 1 CFR part 51). Copies of UL Standards 471, 484, 541, and 60335-2-24, may be purchased by mail at: COMM 2000, 151 Eastern Avenue, Bensenville, IL 60106; Email: orders@shopulstandards.com; Telephone: 1-888-853-3503 in the U.S. or Canada (other countries dial 1-415-352-2178); Internet address: <http://www.shopulstandards.com/Catalog.aspx>.

You may inspect a copy at U.S. EPA's Air Docket; EPA West Building, Room 3334; 1301 Constitution Ave. NW.; Washington, DC or at the National Archives and Records Administration (NARA). For questions regarding access to these standards, the telephone number of EPA'S Air Docket is 202-566-1742. For information on the availability of this material at NARA, call 202-741-6030, or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

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